NUEXCO

3000 SAND HILL ROAD
MENLO PARK, CALIFORNIA 94025

NUEXCO REPORT 166
EXECUTIVE SUMMARY

Exchange Value Drops 25 Cents, to $20.50

The **Exchange Value** as of May 31, 1982 is $20.50 per pound U_3O_8. The drop of $0.25 since last month represents a refinement of downward trends evident last month.

Near-Term Supply and Near-Term Demand Increase

Active sellers in the zero to one year time frame are offering 15.2 million pounds U_3O_8, up 2.2 million pounds from last month. *Active* uranium demand in the zero to one year time frame increased slightly to only 1.6 million pounds U_3O_8. Consequently, the ratio of near-term supply to near-term demand increased slightly from 9.3:1 last month to 9.5:1 this month.

Transaction Value Increases Ten Cents, to $20.70

The **Transaction Value** as of May 31, 1982 is $20.70 per pound U_3O_8. It includes fifteen transactions totaling 4.0 million pounds U_3O_8 and covers a period of four months. The slight increase since last month is due to the closing of two transactions for which negotiations began some months ago, when price levels were higher.

Two Uranium Sales Reported

Two uranium sales are reported this month. The total quantity falls in the range of 0.2 million to 0.6 million pounds U_3O_8. Both were US producer-to-producer transactions.

Conversion Value Drops 20 Cents, to $1.00

The **Conversion Value** as of May 31, 1982 is $1.00 per pound U as UF_6, down 20 cents from last month. One conversion transaction is reported. One US utility sold another US utility conversion services for 300-600 thousand pounds U. As anticipated for the past two months, substantial additional conversion services did enter the secondary market during May. Active sellers are offering 4.9 million pounds U in near-term conversion services, while active demand amounts to only 700 thousand pounds U in near-term conversion services.

Esso Withdraws From Western Mining's Yeelirrie Joint Venture

Esso Exploration and Production Australia, Ltd. announced its withdrawal from the Yeelirrie joint venture. Esso was to have provided half of the development funding for the project and was to have received half of its projected 6 million pounds annual output. Although Esso's action appears to be a setback for the project, it does free Western Mining to offer equity participation as an incentive to potential buyers of Yeelirrie's output.

Australian Government Warns US Against Imposing Import Embargo

The Australian government has threatened to mount a challenge under the General Agreement on Tariffs and Trade if Congress passes the embargo legislation which is now in conference committee.

Europeans React To Proposed US Embargo

European reaction to the prospect of a US embargo on uranium imports has been quite negative. Economic arguments aside, Europeans point out that the US would harm itself by such a move.

Taiwan Nuclear Power Program Reviewed

Taiwan plans to have twelve nuclear units in operation by the year 2000.

Cluff Lake Project Discussed

The *Raw Materials* section contains the third and final installment in a series of articles on Canada's Cluff Lake project, owned by Amok, Ltd. and SMDC.

US Import Embargo Unlikely

Opposition to the proposed uranium import embargo is increasing within the US.

This Executive Summary may be reproduced for internal distribution.

TELEPHONE: (415) 854-1510 TWX: 910-373-1760 TELEX: 345512

B6800-1 7/13/82

NUEXCO

JULY 1982 NUMBER 167

Monthly Report on the Uranium Market

NUEXCO • 3000 Sand Hill Road • Menlo Park, California • 94025

NUEXCO

NUEXCO

Headquarters
3000 Sand Hill Road
Menlo Park, California 94025
Telephone: 415-854-1510
TWX: 910-373-1760 Answerback: NUEXCO MNPK
Telex: 345512 Answerback: ITR NUX MNPK
TELECOPY: 415-854-2115

New York Office
450 Avenue of the Americas, Suite 2A
New York, New York 10011
Telephone: 212-254-3010

U.S. REPRESENTATIVES

Harold C. Lindberg*
83-A Hardee Lane
Whispering Pines, N.C. 28327
Telephone: 919-949-3622

Joe L. Hixon*
302 Lombardy
Sugarland, Texas 77478
Telephone: 713-494-3802

W. Hardy Prentice*
11644 Harborview Drive
Cleveland, Ohio 44102
Telephone: 216-631-2350

OVERSEAS REPRESENTATIVES

Nuexcoafrica
C/O Southern Prospecting (Pty) Limited*
P.O. Box 61409
Marshalltown 2107
Republic of South Africa
Telephone: Johannesburg 838-1868
Telex: 8-9878 Answerback: 8-9878 SA

Nuexcoaustralia
C/O Oratom Consulting*
P.O. Box 70
7 Cliff Street
Milson's Point
NSW 2061, Australia
Telephone: (02) 929-6999
Telex: 73303 Answerback: ORATOM AA73303

Nuexcoeurope - Atlantic
C/O Ucomm (C.I.) Limited*
94 Jermyn Street
London SW1Y 6JL
England
Telephone: 930-0261
Telex: 8813255 Answerback: JERMYN G

Nuexcojapan
C/O Japan Tech Services*
Ohkura Building (3F)
1-4-10 Shiba Daimon
Minato-Ku, Tokyo, Japan
Telephone: 431-6031, 6025
Telex: 242 5060 Answerback: JATECH-J

Nuexcotaiwan
C/O Bee & Liang Company, Limited*
8-G FL Jen AE Mansion
NOK 37 Jen A1 Road Sec. 4
P.O. Box 1396
Taipei, Taiwan 106
Telephone: 02-721-2117
TWX: 785-11570 Answerback: 11570 BEELIANG

*Independent contractors representing Nuexco

NUEXCO

MONTHLY REPORT ON THE URANIUM MARKET

July 1982 No. 167

R. WESLEY MILLER, *EDITOR*

MARKET ACTIVITIES
Pricing 1
Australia 1
Canada 2
Far East 2
United States 3

MARKET DATA
Uranium Supply 5, 6
Uranium Demand 7
Conversion Supply and Demand 8
Current Transactions 9

MARKET ANALYSIS
Production Cost Distributions 10

RAW MATERIALS
Uranium Exploration Methods 14

STATISTICAL DATA
Exchange and Transaction Values 16
Conversion Value 19
Government Statistics 20

FIGURES OF THE MONTH 24

INDEX (Report 166) 24

OPTIMUM TAILS ASSAY 25

STANDARD ABBREVIATIONS 26

NOTICE

This Report is prepared especially for Subscribers and is furnished to them for their use only. Except for internal use by Subscribers, no part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of Nuexco. Neither this Report, nor copies of any portion thereof, may be lent, sold or given to non-subscribers.

The information in this Report was gathered from sources Nuexco believes to be accurate. However, Nuexco makes no warranty, express or implied, and assumes no legal liability or responsibility for the accuracy, completeness or usefulness of any information contained herein.

FOREWORD

Last month's Executive Summary (Report 166 of June, 1982) contained an error in the Transaction Value. It should have reported the Transactioin Value as of May 31, 1982 as $22.70, *not* $20.70. The Transaction Value was *correctly* stated elsewhere in Report 166.

Please replace the incorrect copy of June's Executive Summary with the corrected copy enclosed in this Report.

MARKET ACTIVITIES

PRICING

The **Exchange Value** as of June 30, 1982 is $19.25 per pound U_3O_8, down $1.25 from last month's level of $20.50. Sellers continued their vigorous competition for the limited business available in the current market. The drop of six percent continued the sustained decline of the Exchange Value.

Last month, Report 166 noted "as much as five million pounds of additional U_3O_8 could become available at almost any time." One seller entered the market at competitive prices with a large block of material previously listed in the Inactive category. Active sellers are now offering 17.8 million pounds U_3O_8 for sale in the zero to one year time frame, up 2.6 million pounds from last month.

Active uranium demand in the same time frame dropped by more than 30 percent, to 1.1 million pounds U_3O_8. Consequently, the ratio of near-term supply to near-term demand rose substantially, from 9.5:1 last month to 16.2:1 this month. The aggravated imbalance between supply and demand made itself felt in increased downward pressure on prices throughout the month.

* * *

Transaction Value as of June 30, 1982 is $21.50 per pound U_3O_8, down $1.20 from May. June's Transaction Value includes 11 transactions totaling 2.6 million pounds U_3O_8 and covers a period of four months. The *Market Data* section lists 6 transactions this month.

* * *

The **Conversion Value** as of June 30, 1982 is $1.00 per pound U as UF_6, unchanged from last month. Active sellers are offering 4.5 million pounds U in near-term conversion services, while active demand in the same time frame amounts to only 300,000 pounds U. No conversion transactions are reported this month.

* * *

The **Loan Use Charge Rate** remained at six percent. At least one and possibly more loan transactions are under discussion at that general level.

AUSTRALIA

Denison is encountering continuing problems in its attempts to develop the Koongarra deposit in the Northern Territory. The traditional (Aboriginal) landowners have rejected proposed changes to the lease boundaries which had been intended to correct a cartographical error made when the government enacted the National Park legislation for the area.

Because the deposit is in the center of the Kakadu National Park, the Northern Land Council had proposed that the ore should be milled outside the park at ERA's Ranger mill. This suggestion was not received favorably by federal departments, so Denison's attempts to develop the deposit received a second setback.

* * *

Described by the South Australian Premier as a "once-in-a-lifetime opportunity" for the state, the Roxby Downs project faced indefinite deferral when the Indenture Bill was defeated in the Upper House by an 11 to 10 vote. However, shortly after the crucial vote was taken, a prominent opposition member resigned from Parliament, opening the door for the bill to be presented once again. The new vote produced a tie and the bill passed when the president of the Upper House cast his vote in favor of the bill. The Roxby Downs indenture is now law in South Australia, regulating the rights and obligations of the state and the developers.

Unofficial estimates indicate that the deposit contains at least 7.5 million metric tons of copper and 1,180 million pounds U_3O_8. Although the Roxby Downs uranium content is not included in official estimates of Australia's uranium resources, the deposit could contain almost twice as much as the total Australian resources, officially estimated at 674 million pounds U_3O_8 (reasonably assured resources under $80/kg U_3O_8). The Roxby Downs uranium ore grade is fairly low, so uranium would be produced as a byproduct of copper.

* * *

Ratification of the final agreement between Aboriginal landowners and the Jabiluka partners is expected before the end of June. A recent opinion poll has found that more than 80 percent of the inhabitants of Darwin, and 70 percent of the total population of the Northern Territory, favor uranium mining. This popular support for the industry has prompted the local Labor Party leadership to request the National Party Conference, to be held in July, to revise its hardline policy against uranium mining and export.

The local leader has urged the party to support the mining, processing and export of uranium in the event the Labor Party wins the federal elections. Encouraged by these favorable attitudes, the Northern Territory Government has renewed its bid to establish Australia's first enrichment plant.

© NUEXCO 1982

NUEXCO

MARKET ACTIVITIES

CANADA

This month brought reports of a number of sales by the Key Lake Partners.

1. Ontario Hydro announced that it had purchased 13.5 million pounds from Eldorado Nuclear and Uranerz Exploration & Mining Ltd.

2. Eldorado also renegotiated an earlier sales agreement with a US utility and increased the quantity by one million pounds.

3. SMDC is believed to have signed long term sales agreements with both a US and a European customer.

Recent long term Canadian sales contracts are all believed to be related to market prices at the time of delivery with a floor price and, sometimes, a ceiling. Floor prices offered over the past two years have roughly approximated spot market prices at the time the offers were made. Floor prices have dropped as spot prices have dropped. Their willingness to adjust to the realities of the market is the primary reason the Canadian sellers have been so successful in obtaining new sales commitments. Now that Key Lake is essentially base-loaded and the Exchange Value is below $20 per pound, the need to sell more material soon is greatly reduced. Nuexco expects a decrease in the contracting rate, as compared to the past year or so, and somewhat of a letup in the aggressive Canadian sales efforts.

FAR EAST

Japan recently completed two small, but significant, steps in pursuit of increased self-sufficiency in the nuclear fuel cycle. PNC's pilot enrichment plant began full operation with some 7,000 centrifuges capable of producing about 50,000 swu annually. At the same time, batch operations began at an unusual pilot plant for UF_6 production. The UF_6 plant, having an annual capacity of approximately 400,000 pounds U, produces UF_6 directly from uranium ore without going through the U_3O_8 stage. PNC is studying the potential of constructing such plants at mine sites abroad, making possible the direct import of UF_6.

Plans call for expansion of enrichment capacity in incremental steps. A demonstration plant with an annual capacity of 250,000 swu is scheduled for operation in 1986. Commercial facilities are due for start-up in the late 1980s with a goal of 1 million swu annual capacity by 1995 and 3 million swu annually by the year 2000. Even should these targets be met, Japan will still have to import a substantial portion of its swu requirements.

In both of the cases cited above, the apparent aim is to develop technology and increase security of supply through diversity and indigenous capability. Of course, such goals depend on the continued availability of uranium, a resource almost completely lacking in Japan. Security of uranium supply continues to be achieved by long-term contract, diverse sources and large inventories.

* * *

Japan and Australia have concluded a new bilateral safeguards agreement, on which negotiations first began in 1978. The agreement, initialed in January of this year and signed in March, is now before the Diet in Japan and the appropriate ministers in Australia. Ratification will probably occur shortly; if so, the agreement could enter into force as early as July, 1982. The new agreement follows the same general format as other recent Australian bilaterals, emphasizing provisions relating to re-transfer, reprocessing and enrichment above 20 percent.

* * *

A recent article in the Japanese press commented that the spot U_3O_8 price had declined sharply and could possibly go below $20 per pound in the near future. The article noted that Japanese utilities are paying more than $35 per pound for uranium being delivered under long-term contracts and may, as a consequence of the difference between such prices and current spot prices, be required to reconsider the advisability of further long-term contracting. The article concluded, however, that it would be premature to infer that a change in Japanese contracting philosophy is imminent. Two reasons were cited:

1. The difficulty of guaranteeing, in advance, that large quantities will continue to be available in the spot market;

2. Spot market prices are inherently volatile, so a sudden upward movement could reverse today's situation so that spot prices could substantially exceed prices negotiated under long-term contracts.

Nevertheless, it is interesting that the question has been raised publicly in Japan, where security of long-term raw materials supply has long been a watchword. While no fundamental changes are likely, it is reasonable to anticipate that Japanese negotiating positions will continue to harden while the market remains weak.

© NUEXCO 1982

MARKET ACTIVITIES

UNITED STATES

During June, the negative trend in the US nuclear power industry continued. Actions taken by various organizations will delay the construction of several more nuclear power units. The combined effects of this month's developments and those of recent months will lead to further decrease of the already weakening US demand for uranium.

This month the Nuclear Regulatory Commission's (NRC) Atomic Safety and Licensing Board (ASLB) denied a full power operating license for Cincinnati Gas and Electric's Zimmer nuclear unit, citing problems with the offsite emergency preparedness plan. In addition, the ASLB specified certain additional conditions that must be met before it would authorize a low power operating license. At this point, it is unlikely that the Zimmer unit can begin operating before 1983. Commercial operations had been scheduled to begin this year.

* * *

Southern California Edison indicated it will make the necessary seismic safety design changes to its San Onofre 1 unit rather than defend its existing design to the NRC. The modifications will probably take the rest of 1982 to complete.

* * *

Zimmer's delay and San Onofre Unit 1's one year shutdown will reduce uranium burnup in the short term. That translates into reduced uranium demand in the intermediate or long term. Table 1 summarizes the delays noted in this Report and in Report 166.

The events noted in Table 1 represent cumulative lost demand of about 5.5 million pounds U_3O_8. Although that amount is only one percent of US utilities' estimated reactor requirements (410 million pounds through 1990), it is still significant, for three reasons.

1. That amount is equivalent to the uncommitted supply of any one of several US uranium producers.
2. That amount is only the result of a two-month period.
3. The effects weigh more heavily in the short term than if they were spread more evenly over the decade.

Table 1

US REACTOR DELAYS REPORTED IN NUEXCO REPORTS 166 and 167

Reactor	Utility	Delay
Clinton 1	Illinois Power	Commercial operations delayed 1 year to 1985
Limerick 2	Philadelphia Electric	Likely to be delayed 5 years to the early 1990s
WNP 1	WPPSS	Delayed 2 to 5 years; earliest COD 1991
Hanford 1 & 2	Puget Sound	Indefinitely delayed
San Onofre 1	Southern Calif. Edison	Delayed one year for seismic modifications
Zimmer	Cincinnati Gas & Electric	Delayed until 1983 by problems with offsite emergency preparedness plan

* * *

Reactor setbacks are still affecting the development plans for new uranium mines. One such mine, the Lee Mine in New Mexico, was placed on standby for up to three years by the developer, Kerr McGee. Philadelphia Electric was also participating in the project, so it is not unreasonable to think the latest delay associated with Limerick Unit 2 (see Table 1) influenced the decision to delay the Lee Mine.

* * *

US companies currently producing uranium continue to be pressured by foreign, especially Canadian, competition to supply the unfilled requirements of US utilities. During the first six months of 1982, several major uranium sale contracts have been reported in various uranium industry publications other than the Nuexco Report. Those sales involved approximately 30 million pounds of uranium. Just over half of the contracts, for approximately 15 million pounds, went to non-US companies for uranium to be produced in Canada.

© NUEXCO 1982

MARKET ACTIVITIES

Two conclusions that one can draw from this are:

1. Canadian producers are winning a large share of the current US demand for long term or large quantity contracts.

2. It is still possible for US producers to make sales by competing aggressively for available business.

* * *

The US Supreme Court agreed to review for Pacific Gas and Electric and Southern California Edison the US Court of Appeals decision upholding California's moratorium on new construction and operation of nuclear power plants. The Supreme Court will consider whether the state's rights to impose such a moratorium are preempted by federal law.

Seven states have laws prohibiting in some way new construction of nuclear plants: California, Connecticut, Maine, Maryland, Montana, Oregon and Wisconsin. If states' rights to regulate nuclear power are upheld, it is likely additional states will pass similar legislation.

© NUEXCO 1982

MARKET DATA

URANIUM SUPPLY

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8) 0 to 1 Year	Beyond 1 Year	Remarks
Available for Sale:			
ACTIVE			
1575		500 per year	Long Term
1637	180		
1739	1,600		
1818		250 per year	Long Term
1845	550		
1872	800	400	
1877	50		
1895	1,800		
1900	2,000		some UF_6
1906	60		
1909	2,200		UF_6
1916	2,000		UF_6
1920	3,000		
1921	1,700		UF_6
1925	500		UF_6
1928	1,000		UF_6
1941	300		
1952	26		
TOTAL:	17,766		
INACTIVE			
1581B		150 per year	Long Term
1610	150		
1664	100		
1774	50		
1804	615		
1805		500 per year	Long Term
1810		750	
1814	250		
1932	300		
TOTAL:	1,465		

[1]Measured from the date of this Report

© NUEXCO 1982

NUEXCO

MARKET DATA

URANIUM SUPPLY

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8) 0 to 1 Year	Beyond 1 Year	Remarks
Available for Loan:			
ACTIVE			
1742	500		
1815	1,000		
1884	275		
1919	3,000		
1931	600		
1932A	1,000		
1938	2,000		
1939	800		
TOTAL:	9,175		
INACTIVE			
1910	1,000		
TOTAL:	1,000		
Inquiries to Borrow:			
ACTIVE			
1780	260		
TOTAL:	260		
INACTIVE			
1621	300		
TOTAL:	300		

[1]Measured from the date of this Report

© NUEXCO 1982

MARKET DATA

URANIUM DEMAND

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U_3O_8) 0 to 1 Year	Beyond 1 Year	Remarks
Inquiries to Purchase:			
ACTIVE			
1638		300 per year	
1699	500	400	
1842		500 per year	2,000 Total
1871		250 per year	1983-86
1915		500	UF_6
1924	400		
1933	160		
1945		500	
TOTAL:	1,060		
INACTIVE			
1410		1,500 per year	5,000 Total
1459		200 per year	Long Term
1652		200 per year	Long Term
1843	400		
1888		500 per year	Long Term
1923	30		
1935		400	
1942	250		
TOTAL:	680		

[1]Measured from the date of this Report.

© NUEXCO 1982

NUEXCO

MARKET DATA

CONVERSION SUPPLY

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U as UF6) 0 to 1 Year	Beyond 1 Year	Remarks
ACTIVE			
1584	550	300 per year	Long Term
1607	600		
1609	500	1,500 per year	Long Term
1886	500		
1921	1,700		
1925	450		
1936	200	200 per year	Long Term
TOTAL:	4,500		
INACTIVE			
1619		300	
1840	300		
1902		350	
TOTAL	300		

CONVERSION DEMAND

Nuexco Reference Number	Delivery Period[1] (Thousands of Pounds U as UF6) 0 to 1 Year	Beyond 1 Year	Remarks
ACTIVE			
1622	300	700	
TOTAL:	300		
INACTIVE			
1594	400	450 per year	Long Term
TOTAL:	400		

[1]Measured from the date of this Report.

© NUEXCO 1982

MARKET DATA

CURRENT TRANSACTIONS[1]

Uranium Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current E.V.	Seller	Buyer	Remarks
1778	1982	101-300	95	US Utility	US Utility	Pending required government approval
1779	1982	101-300	95	US Utility	US Utility	Pending required government approval
1808	1982	51-100	—	Non-US Government	Non-US Entity	Definitive price info not available
1824	1982	1-50	—	US Producer	US Producer	Definitive price info not available
1828	1982	101-300	99-100	US Utility	US Utility	
1840	1982	51-100	99	US Producer	US Producer	

Conversion Transactions

Nuexco Reference Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price as Percent of Current C.V.	Seller	Buyer	Remarks

There are no conversion transactions reported this month.

[1]Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.

© NUEXCO 1982

MARKET ANALYSIS

URANIUM PRODUCTION COST DISTRIBUTIONS

Introduction

The Exchange Value's decline over the past three years has confronted many uranium producers, particularly those in the US, with the uranium industry's own version of the classic business dilemma of make-versus-buy. Specifically, some high-cost uranium producers having existing supply contracts may be in a position to determine whether they will fill their contracts with their own production or with material purchased on the spot market.

In making this choice of producing versus procuring, the decision would ideally be reduced to two comparative costs from which the cheapest option for the company would be chosen. Unfortunately, in practice, this is usually not the case. The decision is complex, and consists of at least two considerations: (a) the quantitative, deriving the economic comparison of the two options, and (b) the qualitative, which consists of all the intangible factors that go into such a decision.

In determining the quantitative difference between producing versus procuring, the controlling concept is usually the producer's *variable* forward cost of production.

The concept of *variable forward costs of production* can be useful in industry analysis, particularly during periods of oversupply. (When demand overwhelms available supply, *full costs of production* become more relevant to the market.) An analysis of variable forward costs can give some indications of the price level at which the production sector will experience cost pressures.

Before applying the results of such an analysis to any individual producer, it is necessary to consider other factors, some commercial and some intangible. For example, high prices under a long-term contract may enable an otherwise unprofitable producer to operate quite profitably when spot market prices are low. Also, a strategic commitment to the uranium business could induce a uranium producer to continue operating an unprofitable facility, hoping for an eventual turnaround in market prices.

This Report presents Nuexco's latest estimates of the distribution of uranium production costs for US and non-US producers. Figure 1 displays the results of Nuexco's regression analysis on US uranium production in 1982 as a cumulative (or integral) function of forward costs of production. Figure 2 displays the corresponding results for non-US production of uranium in 1982.

The results shown in Figures 1 and 2 are based on Nuexco's estimates of forward costs of uranium production for each of the operating production facilities participating in the commercial uranium market. This article will discuss the definition and the methods Nuexco used to collect cost data and make the estimates.

Definition

Forward cost of production is a relatively simple concept, but is often difficult to understand. In general, the forward cost of production is *that minimum cost where a producer would experience zero cash flow as a limit.* Since production facilities included in this analysis are currently operating, forward costs of production include only the *variable* costs of production, where variable is defined in the classic accounting sense.

Forward costs *exclude* depreciation, amortization, interest charges and other recoveries of past investments (usually called "sunk costs"). Since forward costs do not include the recovery of sunk costs, forward costs must be less than the total costs of production.

The determination of forward cost of production can be complicated by the wide variety of:

1. Ore body locations and configurations;
2. Environmental and infrastructure conditions;
3. Mining and milling processes;
4. Royalty and severance tax obligations;
5. Marketing and other overhead cost allocations;
6. Cost accumulation and accounting treatments.

Nuexco has defined the *variable* forward cost of production by specifying, for each type of costs, which are included and which are excluded. (If this analysis took into account production centers not yet operating, their forward costs would include some of the costs excluded from *variable* forward costs.)

The *variable* forward cost of production is defined as follows:

1. Included are exploration and development costs associated with mining requirements over the next year. Excluded are all costs of past exploration and development. Also excluded are those current costs associated with mining requirements beyond one year's time.

2. Included are mine stripping costs associated with mining requirements over the next year. Excluded are all "sunk" stripping costs. Also excluded are those current mine stripping costs associated with mining requirements beyond one year's time.

3. Included are all variable costs of mining, hauling and milling operations, such as required labor and materials to sustain and maintain normal operations.

© NUEXCO 1982

MARKET ANALYSIS

Figure 1

URANIUM PRODUCTION COST DISTRIBUTION: US

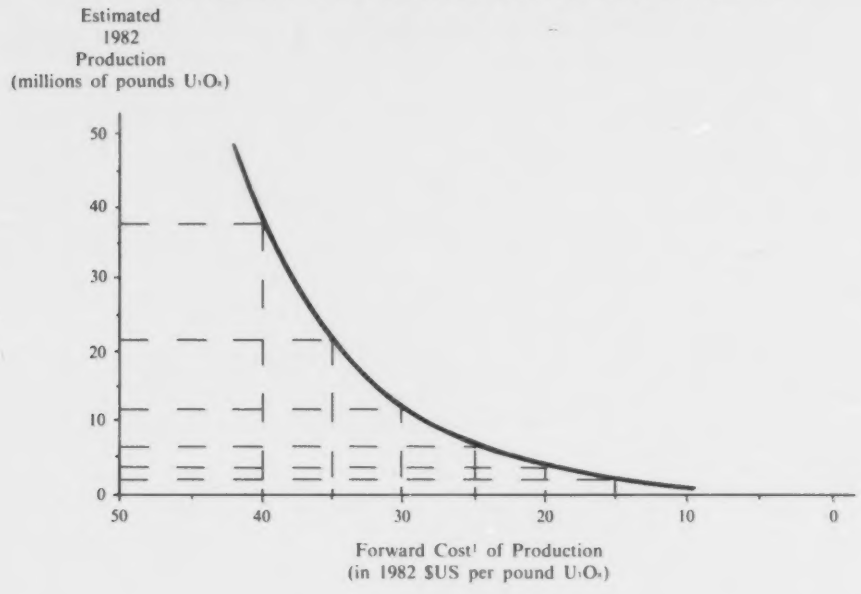
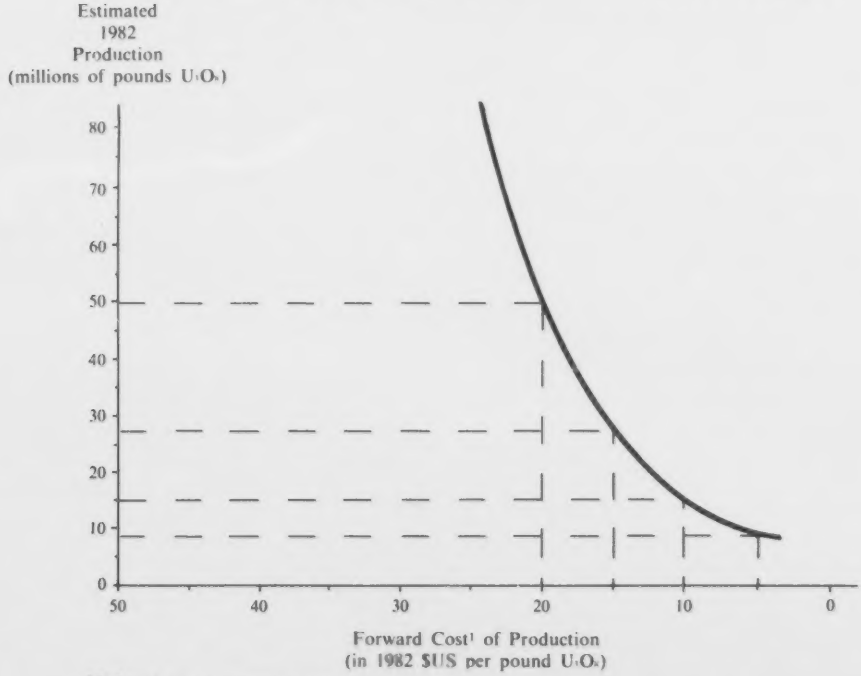


Figure 2

URANIUM PRODUCTION COST DISTRIBUTION: NON-US[2]



[1]Defined in the accompanying text.

[2]Africa, Australia and Canada: Africa includes Gabon, Namibia, Niger and the Republic of South Africa.

© NUEXCO 1982

Excluded are depreciation, amortization, interest on capital and other fixed costs associated with prior investment.

4. Included are costs of operating and maintaining tailings ponds associated with waste storage over the next year. Excluded are all "sunk" tailings pond investment costs and all reclamation costs of mine, mill and tailings pond beyond one year's time.

5. Included are royalties, severance taxes and other fees associated with sustaining normal operations. All costs of maintaining an infrastructure in remote areas are excluded.

6. Included are all marketing costs and variable administrative costs associated with the mining/milling function. Excluded are all fixed administrative costs, including all home office or corporate costs. (Many administrative costs have both variable and fixed cost components which must be segregated.)

7. Included are the normal recovery of minimum capital cost expenditures needed to sustain current operations, but recovery of all "sunk" investments, income taxes and return on investment are excluded.

Methodology

Nuexco cost estimates were not prepared at the level of detail outlined in the definition. They were estimated with the definition in mind and were then evaluated in the context of the detailed outline.

Nuexco has endeavored to obtain the most reliable production cost data available to use for the regression analysis. Some producer cost data came from the public record; some producers have furnished cost data to Nuexco for use in industry studies. With these cost benchmarks, Nuexco personnel and Nuexco representatives in the producing countries have evaluated the individual producers' costs. The cost results were then tested by contracting with the best available expert consultants in several countries to perform independent studies. The results of those external studies were then integrated into the latest Nuexco estimates.

The individual cost estimates likely have a higher *relative* accuracy than *absolute* accuracy. Therefore, the results of this analysis should be more useful as an indicator of trends than as a predictor of the behavior of any individual producer.

Interpretation of Results

Figure 1 shows how much US production from currently active producers can be achieved as a function of a given forward cost of production. The horizontal axis represents variable forward production costs, expressed in 1982 US dollars per pound U_3O_8. The vertical axis represents the estimated quantity of uranium to be produced in the US this year at a variable forward cost of production *less than or equal to* the cost indicated at any point on the curve (i.e., Figure 1 is an integral, or cumulative, cost distribution).

From the expected 1982 US production of about 26 million pounds U_3O_8, some 24 million pounds U_3O_8 can be produced at a forward cost level of $36 per pound U_3O_8 or less. On the other hand, only 12 million pounds U_3O_8 can be produced at a forward cost level of $30 per pound U_3O_8 or less.

Taking the analysis one step further, when the Exchange Value was $32 in May 1980, equivalent to about $36 in mid-1982 dollars, those US producers in operation in 1982 could produce about 24 million pounds U_3O_8 with positive cash flow *if all sales were in the spot market*. Currently, with the Exchange Value below $20, those same producers can produce less than four million pounds U_3O_8 with positive cash flow *if all sales were in the spot market*. The above statements, of course, are theoretical and should not be quoted out of context; US production is expected to be over 26 million pounds U_3O_8 in 1982, even though the Exchange Value has been below $23.50 per pound U_3O_8 so far this year. This is practical because US producers are mostly supplying material under long-term contracts at higher average prices.

Figure 2 shows these same relationships for currently active uranium producers in Africa, Australia and Canada; Africa includes Gabon, Namibia, Niger and South Africa. For example, the expected 1982 production from these six countries of more than 70 million pounds U_3O_8 can be produced at a forward cost level of about $23 per pound U_3O_8 or less. Some 30 million pounds U_3O_8 can be produced at a forward cost level of about $16 per pound U_3O_8 or less. Currently, with the Exchange Value below $20, these same producers can produce about 50 million pounds U_3O_8 with positive cash flow *if all sales were in the spot market*. Again, these statements are theoretical and should not be quoted out of context. Non-US producers are better able to compete in the present spot market, but most also have the benefit of long-term contracts at higher prices to support their operations.

In using the variable cost in the make-versus-buy decision, the uranium producer is comparing the price to purchase with the real savings to be attained if produc-

© NUEXCO 1982

tion is cut. From a purely quantitative standpoint, a producer should be inclined to cut production to the extent that its incremental cost of purchasing concentrates to supply existing contracts is less than its incremental variable cost of producing those concentrates.

The cost of the purchasing option may include more than the purchase price of the concentrates, however. If a mine is to be completely shut down, for example, the cost of taking it off line and maintaining it thereafter must be included in the purchase option. In addition, some mining leases require that, if there is no production from the leased property, certain payments must be made to the lessors, or the lease may be terminated. These payments must also be included in the cost of the buy option.

While the quantitative aspect of the make-versus-buy decision can often be reduced to a single number, or at least a set of numbers, the qualitative aspect is far more difficult to assess. There are numerous intangible factors that must be considered in determining the outcome of the produce versus procure question.

Qualitative factors favoring the continuation of production include

1 A slowdown or shutdown of work may mean the loss of skilled labor.

2 It is not possible to shut down a wet mine entirely without losing it.

3 The producer might not have the contractual right to substitute purchased concentrates under its supply contract. That is, the existing supply contract might require production from a certain ore body. However, if the spot market price is substantially below the producer's variable cost of production, the producer might benefit by renegotiating its contract with its customer to allow for substitution of purchased material, with some mechanism provided for sharing of savings between the producer and the customer.

4 There may be some difficulty in obtaining suitable concentrates on short notice. This might appear improbable given the large worldwide commercial inventories of uranium. However, these inventories are physically located at UF_6 conversion facilities, for the most part. It may, therefore, be difficult to transfer material in the form of concentrates to uranium producers wishing to purchase on short notice.

5 Some mining leases are subject to forfeiture if there is no production from the leased property.

Qualitative factors promoting the purchase option include:

1 Purchasing during a down market would enable a producer to conserve its reserves for a later time when the price might be higher.

2 Uncertainties regarding precipitous changes in environmental, health, and safety legislation, and severance taxes would be mitigated by the purchase option.

3 The producer's anticipated production rate may be insufficient to meet existing obligations.

These and other qualitative factors will normally go into the make-versus-buy decision, along with the quantitative factors. The relative effect of these intangible factors will vary in impact and magnitude and many times will be the critical factor that determines whether it is best for the producer to adopt a procurement policy, or to continue producing.

The make-versus-buy decision will probably not be a one-time decision, but will often be a continuous decision-making function. Changes may occur from time to time which will shift the balance. The spot market price of uranium may change, production costs, especially variable costs, change frequently, and the intangible factors are in a constant state of flux.

© NUEXCO 1982

URANIUM EXPLORATION METHODS

The Nuclear Energy Agency (NEA) of the Organization for Economic Cooperation and Development (OECD) and the International Atomic Energy Agency (IAEA) of the United Nations jointly sponsored an international symposium on uranium exploration methods in Paris, France June 1-4. It was the first such meeting dedicated solely to uranium exploration methods to be sponsored by the international body. About 220 participants from 38 countries attended the symposium.

The NEA and IAEA established in 1976 a joint group of experts from 15 countries to review R & D in uranium exploration techniques. The group recognized an immediate need for the continued development of new uranium exploration technology. Through a collective effort, the group established working projects on an international level covering nine areas of primary concern, listed below:

1. Uranium Exploration Case Histories
2. Uranium Favorability by Mineral Analyses
3. Gases in Uranium Exploration
4. Improvements in the Measurements of Natural Gamma Radiation
5. Borehole Logging
6. Uranium in Granites
7. Recognition of Uranium Provinces
8. Biogeochemical Exploration for Uranium
9. Non-radiometric Subsurface Methods in Uranium Exploration

The purpose of the symposium was to review the exploration process and evaluate the achievements of R & D projects before a scientific gathering. Sixty papers were presented in the process of establishing the objectives of each program, including the evaluation and successes of applied technology to date and the potential for scientific and technical improvements in exploration technology. In keeping with 1976 objectives, the joint group maintains that there should be a continuous effort toward the discovery of additional uranium deposits which will be required to support the nuclear power industry in the twentieth century.

The number of uranium deposits discovered during the relatively short history of the uranium industry (dating back to 1950) is testimony to the successful development and application of early exploration techniques, which of course form the basis for today's R & D activities. Applied geology (and luck) has led to a number of ore discoveries; however, most discoveries are the result of the proper application of innovative exploration technology. Continual improvement in the measurement of natural gamma radiation is perhaps the most important product of on-going R & D. The widespread and varied application of radiation detection technology has been a significant factor in the majority of discoveries. Geochemical and biogeochemical prospecting and the detection of gases associated with uranium also have been important contributors to uranium discoveries.

R & D continues in all of these areas, but advanced exploration technology will be needed to locate the deeper and widely distributed ore deposits of the future. Of special interest is the improved use of alpha and gamma spectrometry for direct analyses of uranium, radium and other decay products in ores and associated rocks. Continued R & D in this area could result in the ability to measure the products of uranium separately and quantitatively in a variety of on-site environments.

Additional R & D projects in an advanced stage of laboratory development include a borehole probe to measure the presence of uranium by x-ray fluorescence. Using this method, the concentration of uranium vs. depth was accurately measured under actual field conditions. Another borehole measurement technique utilizes magnetic susceptibility logging to show low-grade anomalies as well as alteration patterns within the rock, either of which may indicate a nearby uranium deposit. The use of aeromagnetic radiometers to determine the depth of possible ore is in the early stages of field application. Modest success has been achieved to date; continued R & D could lead to a workable exploration tool within the near future. Finally, R & D continues on methods to accomplish the basic recognition of uranium provinces through landsat imagery, geochemical and biogeochemical prospecting and by analysis of the distribution of uranium in various geologic environments.

The basic processes of R & D for uranium exploration technology are still in place and progressing. However, due to the state of the general economy, the slow development of nuclear power generation, and the large uranium reserves known to exist throughout the Free World, support for R & D is beginning to wane.

Financial contributions from government agencies and private industry are falling short of requirements necessary to sustain the R & D programs. This fact is well illustrated by the fact that US DOE eliminated the

© NUEXCO 1982

NURE program as of September 1981, and further by the fact that US industry is taking a passive interest in exploration activities and exploration technology. Only two US producers were present at the Paris symposium.

With the decline of US scientific contributions to exploration R & D, Great Britain, France, Canada, South Africa and Australia will assume the leadership role. It is an interesting paradox that the US, after about 30 years as the leader in almost every aspect of the nuclear industry, is now gradually assuming a secondary role, especially in the development and application of exploration techniques.

© NUEXCO 1982

NUEXCO

STATISTICAL DATA

EXCHANGE VALUE $19.25/lb. U_3O_8
Determined as of June 30, 1982

Definition[1]

The Exchange Value is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the last day of the month.

Derivation

Nuexco bases the Exchange Value upon:

A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Exchange Value:

A. The price of uranium delivered or to be delivered under old contracts.
B. The price of uranium delivered in connection with contract renegotiations or other than arm's length transactions.

[1]In December, 1981, Nuexco published a history of the Exchange Value which chronicled, month-by-month, changes in its definition, usage and derivation. Copies are available upon request.

TRANSACTION VALUE[2]
Determined as of June 30, 1982

$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
21.50	2.6	11	4

Definition

The Transaction Value is a weighted average price of recent transactions, and is based on prices paid for U_3O_8 in transactions closed within the previous three-month period and for which delivery was scheduled within one year of the transaction date. At least ten transactions totaling at least two million pounds U_3O_8 are included in each calculation, or the sample time is extended as necessary to include these minima. Foreign currencies are converted to US dollars as of the transaction date.

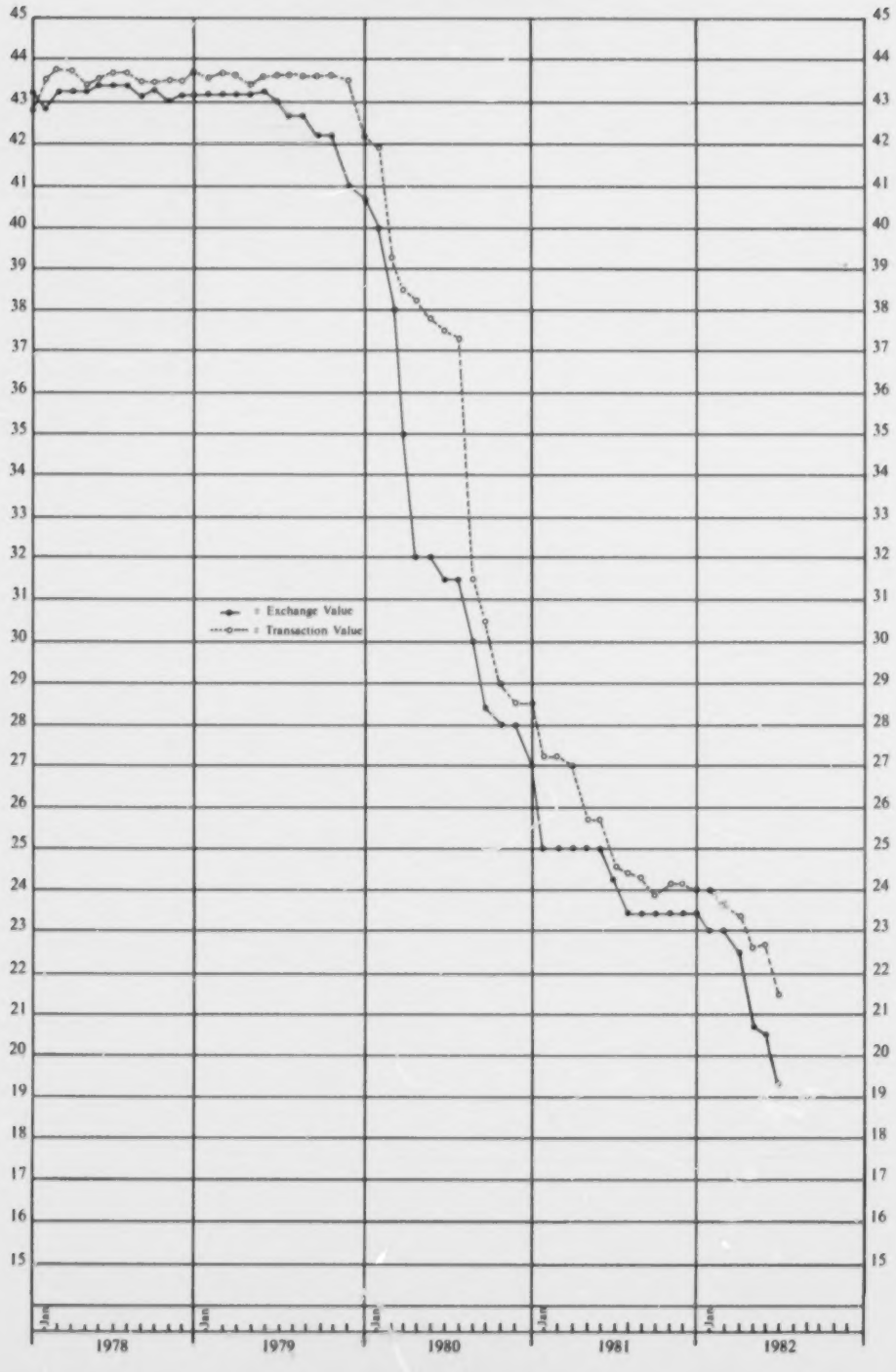
[2]Transaction Values for 1976 through 1981 and their associated parameters (millions of pounds, number of transactions and number of months) are tabulated on pages 31 and 32 of Report 161.

© NUEXCO 1982

STATISTICAL DATA

EXCHANGE AND TRANSACTION VALUES SINCE JANUARY 1978

Determined as of the last day of the month indicated



© NUEXCO 1982

NUEXCO

STATISTICAL DATA

HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25						

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50						

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country	per lb. U_3O_8 in Concentrates	per kg U_3O_8 in Concentrates	per kg U in Concentrates
US (dollar)	19.25	42.44	50.05
France (franc)	131.13	289.09	340.91
FRG (mark)	47.30	104.27	122.96
Japan (yen)	4,936	10,882	12,832
Switzerland (franc)	40.35	88.95	104.90
UK (pound)	11.07	24.40	28.78
Australia (dollar)	18.89	41.64	49.11
Canada (dollar)	24.98	55.08	64.95
Niger, Gabon (CFA)	6,548	14,435	17,022
South Africa (rand)	22.07	48.66	57.38
Sweden (kroner)	118.03	260.20	306.84

[1]Calculated using currency exchange rates published in the Wall Street Journal on the last business day of the month.

© NUEXCO 1982

STATISTICAL DATA

CONVERSION VALUE $1.00/lb. U as UF_6
Determined as of June 30, 1982

Definition

The Conversion Value is Nuexco's judgment of the price at which spot and/or near term transactions for significant quantities of conversion services could be concluded in the secondary market as of the last day of the month.

Derivation

Nuexco bases the Conversion Value upon:
A. Data from recently completed transactions.
B. Data from pending transactions.
C. Firm bids to buy and firm offers to sell.
D. Prices purchasers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy, and prices sellers have expressed a willingness to accept, but for which Nuexco is not aware of firm offers to sell.

Comments

Nuexco does not consider the following in determining the Conversion Value:
A. The price of conversion services delivered or to be delivered under old contracts.
B. The price of conversion services delivered in connection with contract renegotiations or other than arm's length transactions.

LOAN USE CHARGE RATE[1] 6%
Determined as of June 30, 1982

Definition

The Loan Use Charge Rate is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the last day of the month.

Derivation

Nuexco bases the Loan Use Charge Rate upon:
A. Data from recently completed or pending loan transactions.
B. Rates included in firm proposals to borrow or lend.
C. Rates that potential borrowers and lenders have expressed as a willingness to pay or accept, but for which Nuexco is not aware of firm proposals.

[1]Monthly data for 1968 through 1981 appear on pages 32-34 of Report 162.

© NUEXCO 1982

NUEXCO

STATISTICAL DATA

AUSTRALIAN GOVERNMENT STATISTICS

	Price Index of Materials Used in Manufacturing Industry—All Groups (Year 1968-69 = 100.0)[1]	Weighted Average Minimum Weekly Wage Rates—Adult Males Australia Mining and Quarrying (A$)[2]
Annual Avg. 1971[3]	101.5	65.95
Annual Avg. 1972[3]	105.6	71.26
Annual Avg. 1973[3]	124.4	78.96
Annual Avg. 1974[3]	141.9	108.07
Annual Avg. 1975[3]	150.4	132.55
Annual Avg. 1976[3]	168.4	160.93
Annual Avg. 1977[3]	192.0	179.03
Annual Avg. 1978[3]	198.5	190.04
Annual Avg. 1979	248.8	196.34
Annual Avg. 1980	321.8	218.00
Annual Avg. 1981	355.3R	237.27R
Jan 1981	357.8	230.58
Feb 1981	356.6	230.41
Mar 1981	355.2	229.66
Apr 1981	354.6	229.38
May 1981	353.4	237.31
Jun 1981	360.4	237.93
Jul 1981	356.9	237.86
Aug 1981	359.9	237.86
Sep 1981	357.4	237.82
Oct 1981	351.6	239.26
Nov 1981	350.3	241.13
Dec 1981	348.9	258.01
Jan 1982	353.9	259.76
Feb 1982	355.8	259.38R
Mar 1982	359.4	259.38R
Apr 1982	—	258.91P

P = Preliminary R = Revised since last month

[1]Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0), Table 3.
[2]Australian Bureau of Statistics, Canberra: "Wage Rates, Australia" (Catalogue No. 6312.0), Table 1. Figures for the latest fourteen months shown are subject to revision.
[3]Monthly data for 1970 through 1978 appear on pages 4.7 and 4.8 of Nuexco Report 138.

© NUEXCO 1982

STATISTICAL DATA

CANADIAN GOVERNMENT STATISTICS

	Industry Selling Price Index: Manufacturing (D 500000)[1] [2] (1971 = 100.0)	Wage-earner Data: Average Hourly Earnings (C$)[3] [4]		
		Metal Mining, including Milling (SIC 050-059)	Primary Metal Industries, non-ferrous (SIC 296-298)	Chemicals and Chemical Products (SIC 370-379)
Annual Avg. 1978	190.4	8.76	6.82	6.97
Annual Avg. 1979	217.9	9.60	7.35	7.67
Annual Avg. 1980	247.2	10.59	8.05	8.50
Annual Avg. 1981	—	12.02	9.03	9.53
Apr 1981	267.9	11.73	8.76	9.33
May 1981	270.0	11.80	8.90	9.49
Jun 1981	272.3	11.80	9.16	9.57
Jul 1981	274.3	11.92	9.20	9.62
Aug 1981	276.2	11.83	9.15	9.63
Sep 1981	276.9	12.47	9.22	9.77
Oct 1981	279.3	12.78	9.35	9.91
Nov 1981	278.8	12.89	9.45	9.89
Dec 1981	280.0R	12.87	9.42	10.03
Jan 1982	281.9R	13.04R	9.53	10.11R
Feb 1982	283.3R	13.25R	9.60P	10.19P
Mar 1982	284.5R	13.31P	9.62P	10.34P
Apr 1982	286.5P	—	—	—
May 1982	288.5P	—	—	—

P = Preliminary R = Revised since last month

[1]Statistics Canada, Prices Division, Ottawa; "Industry Price Indexes" (Catalogue 62-011), Table 1. Indexes for the most recent six months shown are subject to revision.

[2]Monthly data for 1973 through 1978 appear on page 4.10 of Nuexco Report 138.

[3]Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa; "Employment, Earnings and Hours" (Catalogue 72-002), Table 2.

[4]Monthly data for 1977 and 1978 appear on page 4.11 of Nuexco Report 138.

© NUEXCO 1982

NUEXCO

STATISTICAL DATA

REPUBLIC OF SOUTH AFRICA STATISTICS

	Average Declared Working Costs per Metric Ton of Gold Ore Milled (Rand)[1]	Consumer Price Index[2] (1975 = 100, except where otherwise indicated)	Wholesale Price Index All Groups (1975 = 100)	Total Employment in Mining and Quarrying (Code 35)[5]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[5]
Annual Avg. 1971[3]	7.88	106.4[4]	59.1	652,294	415,956
Annual Avg. 1972[3]	8.79	113.3[4]	63.9	623,067	443,933
Annual Avg. 1973[3]	10.51	124.1[4]	72.3	684,743	572,133
Annual Avg. 1974[3]	13.18	138.5[4]	85.3	674,140	761,596
Annual Avg. 1975[3]	16.71	157.2[4]	100.0	639,473	1,003,617
Annual Avg. 1976[3]	19.30	174.7[4]	115.1	671,240	1,212,983
Annual Avg. 1977[3,6]	23.87	194.4[4]	130.0	712,006	1,420,670
Annual Avg. 1978[3,6]	27.14	137.2	142.7	664,571	1,537,169
Annual Avg. 1979[3,6]	30.18	155.3	164.5	692,209	1,830,632
Annual Avg. 1980[6]	35.53	176.7	192.1	714,379	2,279,615
Annual Avg. 1981	41.89	203.5	218.3	728,506	2,820,505
Jan 1981	—	191.0	207.2	729,575	219,969
Feb 1981	—	193.8	209.8	725,647	210,275
Mar 1981	39.26	195.2	209.9	705,010	210,151
Apr 1981	—	196.4	211.6	719,674	217,124
May 1981	—	197.7	213.2	726,869	219,880
Jun 1981	40.41	200.0	215.3	728,506	237,049
Jul 1981	—	204.6	218.4	735,839	249,080
Aug 1981	—	208.0	222.6	722,684	245,817
Sep 1981	43.28	211.6	224.6	724,604	251,502
Oct 1981	—	213.4	227.0	717,918	248,159
Nov 1981	—	214.8	229.4	720,255	253,044
Dec 1981	44.52	216.3	230.4	709,612	257,655
Jan 1982	—	217.6	233.1	700,375	257,173
Feb 1982	—	220.2	236.8	705,992	250,191
Mar 1982	45.49	225.2	237.4	—	—
Apr 1982	—	228.9	241.9	—	—
May 1982	—	230.3	244.8	—	—

[1]Chamber of Mines of South Africa, Johannesburg; "Analysis of Working Results," published quarterly.
[2]Republic of South Africa Department of Statistics, Pretoria; "Government Gazette: Consumer Price Index for Urban Areas."
[3]Historical data for the Average Declared Working Costs and Consumer Price Index 1970-1979 appear on page 4.9 of Nuexco Report 140.
[4]April 1970 = 100.00.
[5]Bulletin of Statistics, Department of Statistics, Pretoria.
[6]Historical data for Codes 35 and 40 1977-1980 appear on page 28 of Nuexco Report 157.

© NUEXCO 1982

STATISTICAL DATA

US GOVERNMENT STATISTICS

	Producer Price Index—Industrial Commodities (1967 = 100)[1]	Producer Price Index—All Commodities (1967 = 100)[1]	Consumer Price Index (1967 = 100)[2]	GNP Implicit Price Deflator (1972 = 100)[3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
					Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
Annual Avg. 1971[5]	114.1	114.0	121.3	96.02	4.12	4.15	3.97	3.49
Annual Avg. 1972[5]	117.9	119.1	125.3	100.00	4.56	4.59	4.26	3.71
Annual Avg. 1973[5]	125.9	134.7	133.1	105.80	4.84	4.98	4.51	3.91
Annual Avg. 1974[5]	153.8	160.1	147.7	116.02	5.44	5.63	4.88	4.21
Annual Avg. 1975[5]	171.5	174.9	161.2	127.15	6.13	6.24	5.39	4.64
Annual Avg. 1976[5]	182.4	183.0	170.5	133.71	6.76	6.87	5.91	4.96
Annual Avg. 1977[5]	195.1	194.2	181.5	141.70	7.28	7.67	6.43	5.39
Annual Avg. 1978[5]	209.4	209.3	195.4	152.05	8.23	8.56	7.02	5.82
Annual Avg. 1979[5]	236.5	235.6	217.4	165.46	9.27	9.50	7.60	6.32
Annual Avg. 1980[5]	274.8	268.8	246.8	177.36	10.27	10.63	8.30	6.95
Annual Avg. 1981	304.1	293.4	272.4	193.71	11.55R	11.98R	9.12	7.62R
Jun 1981	305.1	294.5	271.3	191.06	11.29R	11.90R	9.07	7.56R
Jul 1981	306.2	296.0	274.4	—	11.60R	12.21R	9.16	7.65R
Aug 1981	307.2	296.2	276.5	—	11.84R	12.10R	9.19	7.73R
Sep 1981	307.4	295.7	279.3	195.61	12.10R	12.70R	9.38	7.75R
Oct 1981	309.0	296.1	279.9	—	12.08R	12.44R	9.37	7.80R
Nov 1981	309.3	295.9	280.7	—	12.12R	12.48R	9.42	7.83R
Dec 1981	310.0	295.8	281.5	200.10	12.08R	12.45R	9.53R	7.90R
Jan 1982	311.8R	298.3R	282.5	—	12.19R	12.66R	9.68	7.98R
Feb 1982	311.4P	298.5P	283.4	—	12.22R	12.61R	9.68	7.96R
Mar 1982	311.0P	297.9P	283.1	201.99R	12.29R	12.69R	9.71R	8.01R
Apr 1982	309.9P	297.9P	284.3	—	12.26P	12.65P	9.79P	8.03P
May 1982	309.5P	298.6P	287.1	—	—	—	9.77P	8.08P

P = Preliminary R = Revised since last month

[1]US Bureau of Labor Statistics, Washington, D.C.; "Producer Prices and Price Indexes," Table 6 (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents.

[2]US Bureau of Labor Statistics, Washington, D.C.; Consumer Price Index for All Urban Consumers, US City Average, All Items.

[3]US Department of Commerce, Washington, D.C.; Bureau of Economic Analysis, National Income and Wealth Division; "Survey of Current Business," Table A. The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted.

[4]US Bureau of Labor Statistics, Washington, D.C.; "Employment and Earnings," Table C-2. All data based on 1972 revision of SIC Manual. Data for 1970-1976 are adjusted to the March 1977 benchmark. Data for 1977-1978 are adjusted to the March 1979 benchmark. Data for January 1979 and beyond are adjusted to the March 1980 benchmark.

[5]Monthly data 1970-1978 for Producer Price Index-Industrial Commodities, Consumer Price Index, and Employment and Earnings SIC codes 10, 333, and 28, and quarterly data for GNP Implicit Price Deflator appear on pages 4.6-4.8 of Nuexco Report 139.
Monthly data 1977-1978 for Employment and Earnings SIC Codes 10, 333, and 28 appear on page 33 of Nuexco Report 147.
Monthly data 1970-1978 for Employment and Earnings SIC Code 36 appear on page 23 of Nuexco Report 154.
Monthly data 1979-1980 for Employment and Earnings, Revised Establishment Data, all listed codes, appear on page 22 of Nuexco Report 158.
Monthly data 1977-1980 for Producer Price Index-All Commodities, appear on page 21 of Nuexco Report 158.

© NUEXCO 1982

NUEXCO

FIGURES OF THE MONTH

	This Month	Last Month	12 Months Ago
	(Referenced to May 31, 1982)		
Exchange Value[1]	19.25	20.50	24.25
Transaction Value[1]	21.50	22.70	24.50
Conversion Value[2]	1.00	1.00	1.15
Loan Use Charge Rate[3]	6%	6%	5½%
Near-Term Uranium Supply[4]	17.8	15.2	5.2
Near-Term Uranium Demand[5]	1.1	1.6	1.0
Near-Term Supply-Demand Ratio	16.2	9.5	5.2
Optimum Tails Assay[6]	.327	.318	.285
Current Transactions[7]:			
Number of Transactions	6	2	4
Quantity of Material[8]	0.4-1.2	0.2-0.6	1.0-2.1

[1]US $ per pound U_3O_8 equivalent
[2]US $ per pound U as UF_6
[3]Percent per annum
[4]Active inquiries to sell, for delivery within 12 months after contract signing (millions of pounds U_3O_8)
[5]Active inquiries to purchase, for delivery within 12 months after contract signing (millions of pounds U_3O_8)
[6]Percent U_{235}
[7]Uranium transactions only; does not include loans or conversion transactions
[8]Millions of pounds U_3O_8, equivalent

INDEX

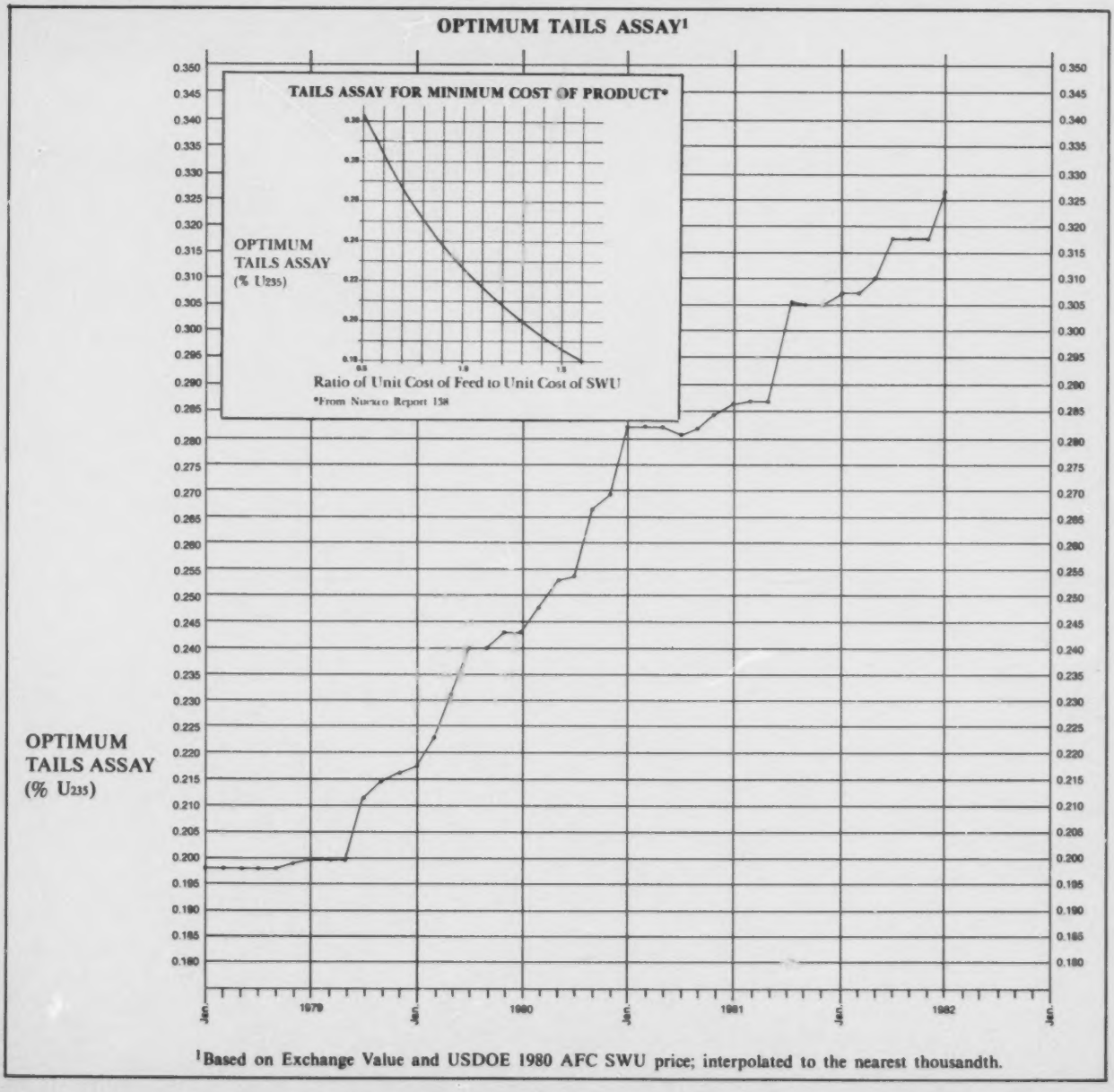
Report 166	Page
Australia — Esso withdraws from Yeelirrie project	1
— Government opposes US embargo	2
Europe — Strong opposition to proposed US embargo	2
Japan — Waning enthusiasm for new uranium purchases	4
Raw Materials — Cluff Lake, Part 3	13
Taiwan — Status of national nuclear power program	4
United Kingdom — CEGB names new chairman	4
United States — More reactor delays	5
— LaSalle 1 gets low power license	6
— Susquehanna 1 gets ASLB approval	6
— Widespread opposition to embargo idea	6

© NUEXCO 1982

OPTIMUM TAILS ASSAY

The optimum tails assay is the tails composition at which the cost of enriched uranium is lowest for given costs of separative work (SWU) and natural uranium feed. It depends only on the ratio of the cost of a kilogram of natural uranium in the form of UF_6 to the cost of a kilogram unit of separative work. Holders of US Department of Energy (USDOE) Adjustable Fixed Commitment (AFC) enrichment contracts have the option to specify, within limits, the transaction tails assay. The transaction tails assay for USDOE Requirements contracts is 0.2 percent U_{235}. For every one-hundredth of one percent increase in the transaction tails assay, natural uranium consumption increases about two percent.

OPTIMUM TAILS ASSAY[1]



[1]Based on Exchange Value and USDOE 1980 AFC SWU price; interpolated to the nearest thousandth.

NUEXCO

STANDARD ABBREVIATIONS

ACTU:	Australian Council of Trade Unions
AEB:	Atomic Energy Board (South Africa)
AEC:	Atomic Energy Commission (US) (predecessor of NRC and DOE)
AECB:	Atomic Energy Control Board (Canada)
AFC:	Adjustable fixed commitment (swu contract)
AFR:	Away from reactor
AFUDC:	Allowance for Funds Used During Construction
AGR:	advanced gas-cooled reactor
BLWR:	same as BWR
BNFL:	British Nuclear Fuels, Ltd. (UK)
BWR:	boiling water reactor
CEA:	Commissariat a l'Energie Atomique (France)
CEGB:	Central Electricity Generating Board (UK)
CNEA:	Comision National de la Energia Atomica (Argentina)
COMINAK:	Compagnie des Mines d'Akouta (Republic of Niger)
DOE:	Department of Energy (US)
EEC:	European Economic Community
EIA:	Energy Information Agency (US)
EMR:	Department of Energy Mines & Resources (Canada)
ENEL:	Ente Nationale per l'Energie Elettrica
ENUSA:	Empresa Nacional del Uranio S.A. (Spain)
ERA:	Energy Resources of Australia
ESCOM:	Electricity Supply Commission (South Africa)
EdF:	Electricite de France
FBFC:	Societe Franco-Belge de Fabrications de Combustibles
FBR:	Fast breeder reactor
FRG:	Federal Republic of Germany
GCHWR:	gas-cooled heavy-water moderated reactor
GCR:	gas-cooled reactor
GNP:	Gross National Product
HTGR:	high-temperature gas-cooled reactor
HWLWR:	heavy water moderated boiling light-water-cooled reactor
IAEA:	International Atomic Energy Agency
INFCE:	International Nuclear Fuel Cycle Evaluation
JAURD:	Japan-Australia Uranium Resource Development Co.
JEN:	Junta de Energia Nuclear (Spain)
LGR:	light-water cooled graphite-moderated reactor
LMFBR:	liquid metal fast breeder reactor
LTFC:	Long-term fixed commitment (swu contract)
LWBR:	light-water breeder reactor
LWCHW:	light-water-cooled heavy-water-moderated reactor
MITI:	Ministry of International Trade and Industry (Japan)
MMN:	Metallurgie et Mecanique Nucleaires
MWe:	Megawatts of electricity
NAPOCOR:	National Power Corporation (Philippines)
NNPA:	Nuclear Non-proliferation Act (US)
NPT:	Treaty on Non-Proliferation of Nuclear Weapons
NRC:	Nuclear Regulatory Commission (US)
NSSS:	Nuclear Steam Supply System
NUFCOR:	Nuclear Fuels Corporation of South Africa Ltd.
OURD:	Overseas Uranium Resources Development Co., Ltd.
PHWR:	pressurized heavy-water-moderated and cooled reactor
PNC:	Power Reactor and Nuclear Fuel Development Corporation (Japan)
PSC:	Public Service Commission
PUC:	Public Utility Commission (US)
PWR:	pressurized water reactor
RAR:	Reasonably assured resources
RTZ:	Rio Tinto-Zinc Corporation Ltd. (UK)
SMDC:	Saskatchewan Mining Development Corporation (Canada)
SOMAIR:	Societe des Mines de l'Air
SSPB:	Swedish State Power Board
SWU:	Separative Work Unit
THTR:	thorium high-temperature reactor
TMI:	Three Mile Island (US)
TVA:	Tennessee Valley Authority (US)
UEGA:	Uranium Enrichment Group of Australia
UK:	United Kingdom
URDC:	Uranium Resources Development Corp. (Japan)
USBLS:	United States Bureau of Labor Statistics
VTAO:	Variable tails option (swu contract)
WOCA:	World outside communist areas
FIFO:	First in, First out
LIFO:	Last in, First out

© NUEXCO 1982

PERSONNEL

George White, Sr.
Chairman

J. Robert Wolcott
President

George White, Jr.
Senior Vice President

Richard K. Andersen
Vice President and Senior Consultant

Sanford C. Anderson
Vice President

Thomas A. Boyden
Vice President

Wayne D. Fowler
Vice President

Kenneth R. McCue
Vice President

R. Wesley Miller
Vice President

M. Jerry Reaves
Vice President

James E. Vaughan
Vice President

Mathias M. Klingler
Chief Financial Officer

Robert J. Alexander
Fuel Cycle Consultant

Kathryn K. Bowen
Manager, Uranium Marketing

W. Scott Hickman
Manager, Business Development

Judith L. Sellers
Manager, Market Research

Teresa Elms Lindsay
Associate

Kim M. Peyton
Associate

REPRESENTATIVES AND PERSONNEL OF OVERSEAS REPRESENTATIVES

Peter R. Stork
Australia

France Millet Hamilton
Europe — Atlantic

Kazy Yokota
Japan

Chris I. Von Christierson
South Africa/Namibia

Edward Bee
Taiwan

Joe L. Hixon
United States

Harold C. Lindberg
United States

W. Hardy Prentice
United States

SPECIAL CONSULTANTS

Raymond C. Freeman
Santa Barbara, California

S.K. Pyo
Seoul, Korea

Ely Sefchovich
San Jose, California

W. Bryan Webster
San Jose, California

T.C. Wu
Hong Kong